

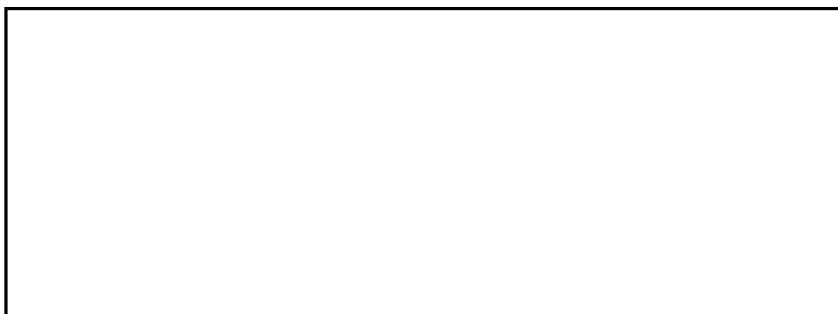
11 December 1963

MEMORANDUM FOR: Chief, Development Branch

SUBJECT : Trip Report - 6 December 1963

1. Place & Persons Visited

A.



25X1A

2. Purpose

25X1A The purpose was to review the results of the Phase I effort of the [redacted], titled "Ultra-High Resolution Virtual Image Viewer", their proposal for Phase II, our own experimental work and its possible application and the feasibility of designing and generating diffraction gratings of the required nature which is to be used in the contractor's particular approach to the problem.

3. Discussion

The discussion began with a review of events carrying through the submission of the Phase I final report and the proposal for Phase II.

The next topic was the diffraction grating and the restraints it imposed upon the virtual image viewing system.

25X1A The coherent data processing technique outlined in the memorandum of 31 October 1963 from [redacted] was discussed as a possible basis of approach, inasmuch as it equalized diffraction order intensity in a manner different from that proposed. The discussion concluded that the difficulties of using a coherent system were greater than those which would be encountered in developing the diffraction gratings. The conclusion that the diffraction grating development should be undertaken also proceeded from the fact that it was felt that only seven orders would be required - not the original seventeen. This reduced the problem by nearly an order of magnitude, and the conclusion of feasibility made much easier to accept.

DECLASS REVIEW by NIMA/DOD



25X1A The discussion was then returned to the diffraction grating. This was chaired by [] He presented three approaches to the problem of obtaining even illumination throughout the required number of orders to be concerned with.

1. Shaped Groove Grating
2. The Ghost Grating
3. Tandem Gratings

25X1A The tandem grating was discarded since it imposed side effect problems. There was no reservation concerning attaining the desired goal on the part of []

25X1A [] recommended pursuing the shaped groove grating primarily with a parallel effort on the ghost grating. He estimated that one to two months would be required to make calculations and determine the experimental direction. Since the ruling tool is of paramount importance it would take four to six months to design and manufacture it properly. The next step would be to rule two inch squares and evaluate. Several gratings would have to be generated. In eight to nine months a 10 inch square could be ruled and replicas made. These would be the ultimately desired gratings for the viewer. The whole effort would be accomplished in 8-9 months from go-ahead and would cost in the neighborhood of a minimum of [] and not more than []

25X1A

25X1A The discussion returned then to the logical approach to be taken for the Phase II effort. This summarizes those points:

1. Magnification as a goal of 100X, presently required 50X in steps of 12, 25 & 50X or zoom through this range. No effort was to be applied to designing a zoom lens but use those fixed magnifications available. The experimental engineering model (breadboard) is to have a least 25X as maximum.

2. To begin design and construction of the experimental engineering model and allow, after construction, the contractor/s to retain and conduct experiments upon it prior to delivery of the designed grating. This would require utilization of commercial gratings. Evaluation would be performed after delivery of the developed even-ordered-illumination grating prior to delivery to the Development Staff.

3. The Development Branch would then accept delivery of the experimental engineering model and evaluate it before a finalization of design for a prototype working instrument.

4. Conclusions

After again viewing the breadboard optical bench demonstration for Phase I effort it became more conclusive that this approach was par excellence and should be pursued immediately.

25X1A

The contents of paragraph 3 above should be the foundation for soliciting [] for a revised proposal.

5. Recommendations

25X1A

The [] should be requested to re-submit a proposal along the lines of the discussion, subcontracting to [] for the optical system and final overall system evaluation and [] for the development of the appropriate grating.

25X1A

25X1A

This proposal should be the base for a negotiated contract.

25X1A

25X1A

Exploratory Development Lab. Branch